

Who's Minding the Mind?

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In a recent experiment, psychologists at Yale altered people's judgments of a stranger by handing them a cup of coffee.



The study participants, college students, had no idea that their social instincts were being deliberately manipulated. On the way to the laboratory, they had bumped into a laboratory assistant, who was holding textbooks, a clipboard, papers and a cup of hot or iced coffee — and asked for a hand with the cup.

That was all it took: The students who held a cup of iced coffee rated a hypothetical person they later read about as being much colder, less social and more selfish than did their fellow students, who had momentarily held a cup of hot java.

Findings like this one, as improbable as they seem, have poured forth in psychological research over the last few years. New studies have found that people tidy up more thoroughly when there's a faint tang of cleaning liquid in the air; they become more competitive if there's a briefcase in sight, or more cooperative if they glimpse words like “dependable” and “support” — all without being aware of the change, or what prompted it.

Psychologists say that “priming” people in this way is not some form of hypnotism, or even subliminal seduction; rather, it's a demonstration of how everyday sights, smells and sounds can selectively activate goals or motives that people already have.

More fundamentally, the new studies reveal a subconscious brain that is far more active, purposeful and independent than previously known. Goals, whether to eat, mate or devour an iced latte, are like neural software programs that can only be run one at a time, and the unconscious is perfectly capable of running the program it chooses.

The give and take between these unconscious choices and our rational, conscious aims can help explain some of the more mystifying realities of behavior, like how we can be generous one moment and petty the next, or act rudely at a dinner party when convinced we are emanating charm.

“When it comes to our behavior from moment to moment, the big question is, ‘What to do next?’ ” said John A. Bargh, a professor of psychology at Yale and a co-author, with Lawrence Williams, of the coffee study, which was presented at a recent psychology conference. “Well, we’re finding that we have these unconscious behavioral guidance systems that are continually furnishing suggestions through the day about what to do next, and the brain is considering and often acting on those, all before conscious awareness.”

Dr. Bargh added: “Sometimes those goals are in line with our conscious intentions and purposes, and sometimes they’re not.”

Priming the Unconscious

The idea of subliminal influence has a mixed reputation among scientists because of a history of advertising hype and apparent fraud. In 1957, an ad man named James Vicary claimed to have increased sales of Coca-Cola and popcorn at a movie theater in Fort Lee, N.J., by secretly flashing the words “Eat popcorn” and “Drink Coke” during the film, too quickly to be consciously noticed. But advertisers and regulators doubted his story from the beginning, and in a 1962 interview, Mr. Vicary acknowledged that he had trumped up the findings to gain attention for his business.

Later studies of products promising subliminal improvement, for things like memory and self-esteem, found no effect.

Some scientists also caution against overstating the implications of the latest research on priming unconscious goals. The new research “doesn’t prove that consciousness never does anything,” wrote Roy Baumeister, a professor of psychology at [Florida State University](#), in an e-mail message. “It’s rather like showing you can hot-wire a car to start the ignition without keys. That’s important and potentially useful information, but it doesn’t prove that keys don’t exist or that keys are useless.”

Yet he and most in the field now agree that the evidence for psychological hot-wiring has become overwhelming. In one 2004 experiment, psychologists led by Aaron Kay, then at [Stanford University](#) and now at the University of Waterloo, had students take part in a one-on-one investment game with another, unseen player.

Half the students played while sitting at a large table, at the other end of which was a briefcase and a black leather portfolio. These students were far stingier with their money than the others, who played in an identical room, but with a backpack on the table instead.

The mere presence of the briefcase, noticed but not consciously registered, generated business-related associations and expectations, the authors argue, leading the brain to run the most appropriate goal program: compete. The students had no sense of whether they had acted selfishly or generously.

In another experiment, published in 2005, Dutch psychologists had undergraduates sit in a cubicle and fill out a questionnaire. Hidden in the room was a bucket of water with a splash of citrus-scented cleaning fluid, giving off a faint odor. After completing the questionnaire, the young men and women had a snack, a crumbly biscuit provided by laboratory staff members.

The researchers covertly filmed the snack time and found that these students cleared away crumbs three times more often than a comparison group, who had taken the same questionnaire in a room with no cleaning scent. “That is a very big effect, and they really had no idea they were doing it,” said Henk Aarts, a psychologist at Utrecht University and the senior author of the study.

The Same Brain Circuits

The real-world evidence for these unconscious effects is clear to anyone who has ever run out to the car to avoid the rain and ended up driving too fast, or rushed off to pick up dry cleaning and returned with wine and cigarettes — but no pressed slacks.

The brain appears to use the very same neural circuits to execute an unconscious act as it does a conscious one. In a study that appeared in the journal *Science* in May, a team of English and French neuroscientists performed brain imaging on 18 men and women who were playing a computer game for money. The players held a handgrip and were told that the tighter they squeezed when an image of money flashed on the screen, the more of the loot they could keep.

As expected, the players squeezed harder when the image of a British pound flashed by than when the image of a penny did — regardless of whether they consciously perceived the pictures, many of which flew by subliminally. But the circuits activated in their brains were similar as well: an area called the ventral pallidum was particularly active whenever the participants responded.

“This area is located in what used to be called the reptilian brain, well below the conscious areas of the brain,” said the study’s senior author, Chris Frith, a professor in neuropsychology at University College London who wrote the book “*Making Up The Mind: How the Brain Creates our Mental World.*”

The results suggest a “bottom-up” decision-making process, in which the ventral pallidum is part of a circuit that first weighs the reward and decides, then interacts with the higher-level, conscious regions later, if at all, Dr. Frith said.

Scientists have spent years trying to pinpoint the exact neural regions that support conscious awareness, so far in vain. But there's little doubt it involves the prefrontal cortex, the thin outer layer of brain tissue behind the forehead, and experiments like this one show that it can be one of the last neural areas to know when a decision is made.

This bottom-up order makes sense from an evolutionary perspective. The subcortical areas of the brain evolved first and would have had to help individuals fight, flee and scavenge well before conscious, distinctly human layers were added later in evolutionary history. In this sense, Dr. Bargh argues, unconscious goals can be seen as open-ended, adaptive agents acting on behalf of the broad, genetically encoded aims — automatic survival systems.

In several studies, researchers have also shown that, once covertly activated, an unconscious goal persists with the same determination that is evident in our conscious pursuits. Study participants primed to be cooperative are assiduous in their teamwork, for instance, helping others and sharing resources in games that last 20 minutes or longer. Ditto for those set up to be aggressive.

This may help explain how someone can show up at a party in good spirits and then for some unknown reason — the host's loafers? the family portrait on the wall? some political comment? — turn a little sour, without realizing the change until later, when a friend remarks on it. "I was rude? Really? When?"

Mark Schaller, a psychologist at the University of British Columbia, in Vancouver, has done research showing that when self-protective instincts are primed — simply by turning down the lights in a room, for instance — white people who are normally tolerant become unconsciously more likely to detect hostility in the faces of black men with neutral expressions.

"Sometimes nonconscious effects can be bigger in sheer magnitude than conscious ones," Dr. Schaller said, "because we can't moderate stuff we don't have conscious access to, and the goal stays active."

Until it is satisfied, that is, when the program is subsequently suppressed, research suggests. In one 2006 study, for instance, researchers had [Northwestern University](#) undergraduates recall an unethical deed from their past, like betraying a friend, or a virtuous one, like returning lost property. Afterward, the students had their choice of a gift, an antiseptic wipe or a pencil; and those who had recalled bad behavior were twice as likely as the others to take the wipe. They had been primed to psychologically "cleanse" their consciences.

Once their hands were wiped, the students became less likely to agree to volunteer their time to help with a graduate school project. Their hands were clean: the unconscious goal had been satisfied and now was being suppressed, the findings suggest.

What You Don't Know

Using subtle cues for self-improvement is something like trying to tickle yourself, Dr. Bargh said: priming doesn't work if you're aware of it. Manipulating others, while possible, is dicey. "We know that as soon as people feel they're being manipulated, they do the opposite; it backfires," he said.

And researchers do not yet know how or when, exactly, unconscious drives may suddenly become conscious; or under which circumstances people are able to override hidden urges by force of will. Millions have quit [smoking](#), for instance, and uncounted numbers have resisted darker urges to misbehave that they don't even fully understand.

Yet the new research on priming makes it clear that we are not alone in our own consciousness. We have company, an invisible partner who has strong reactions about the world that don't always agree with our own, but whose instincts, these studies clearly show, are at least as likely to be helpful, and attentive to others, as they are to be disruptive.